Poster Session I

Coordinator - Phillip Jardon, DVM

The development and testing of a vaccine for the prevention of infectious bovine keratoconjunctivitis

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Summary

We have purified, concentrated and stabilized the protein cytotoxin from Moraxella bovis. The toxin is concentrated on a filter with a 500,000 kDa molecular weight cut off. Small proteins are removed by extensive diafiltration on the same filter. The cytotoxin is concentrated approximately 500 fold, and remains active after 5 months of freezing. A vaccine trial for toxicity and efficacy were performed. Three groups of 5 calves each were given the cytotoxin preparation adjuvanted with Quil A formulated in immunostimulating complexes (ISCOM's), or oil, or aluminum hydroxide. Calves vaccinated with the oil adjuvanted vaccines had higher neutralizing and ELISA titers than the ISCOM group calves, and both of these groups had higher titers than the calves in the aluminum hydroxide group. Lacrimal secretions from the ISCOM vaccinated calves had a 6 fold post vaccination increase in neutralizing titers compared to a 2 fold increase in the oil and aluminum hydroxide vaccinated group.

A subsequent field study using 82 cross bred Hereford calves compared the protective effects of the oil adjuvanted and the ISCOM adjuvanted vaccines. The calves were randomly assigned to groups that were designated to receive either an oil adjuvanted vaccine(n=33), an ISCOM adjuvanted vaccine (n=29), a sham oil adjuvant group (n=10), or a sham ISCOM adjuvant (n=10) group. The sham group calves were given vaccine with adjuvant only (no cytotoxin). None of the calves in the ISCOM vaccine group developed corneal ulcers <0.6 cm in diameter. This compared to 24% of oil vaccinates which developed corneal ulcers >0.6 cm in diameter. The results of this study indicate that the ISCOM based vaccine may be an effective preventive for infectious bovine keratoconjunctivitis.

Evaluation of Type II Killed BVD Vaccine in the Face of Type II BVD Challenge

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Type II BVD continues to be a concern for cattle producers. Type I MLV BVD vaccines reportedly provide adequate protection against disease caused by Type II BVD. However, MLV vaccines cannot be used in all management situations. This study was designed to test the efficacy of an experimental killed Type II BVD vaccine. In addition, the study compared results with efficacy of modified live and killed Type I BVD vaccines, as well as with efficacy of a killed Type II/MLV Type I combination.

Cattle (n=30) that were seronegative against BVD (SN<1:2) were divided into five test groups of six animals each. On days 0 and 14, cattle were bled and vaccinated with one of the following preparations: **1)**

MLV Type I BVD vaccine. This vaccine was prepared according to the current outline of production for MLV BVD vaccine. Product was reconstituted and administered according to the label directions at the time of use. **2)** Killed Type I BVD vaccine. This vaccine was prepared according to the current outline of production for KBVD vaccine. Product was administered according to the label directions. **3)** Killed Type II BVD vaccine. This vaccine was prepared and formulated according to the current outline of production for KBVD vaccine **except** that Type II BVD Strain 125 (NVSL, Ames, Iowa) was used in place of strain C24V. 9CFR final product release tests were performed on the final product. Animals were inoculated with 2 ml of the preparation containing no less than 6.5 logs of Type II Killed BVD virus per dose. **4)** Killed Type I BVD/MLV Type II BVD vaccine. MLV Type I BVD vaccine was reconstituted with the killed type II BVD vaccine described in 3). **5)** RPMI 1640 (untreated control).

Calves were bled on days 21 and on day of challenge. Calves from each group were challenged with Type II BVD (BVD CHV, "890" 94-9, 11/94, NVSL, Ames, Iowa) according to the NVSL Type II challenge protocol on day 28. After challenge, animals were observed daily. Daily rectal temperatures were obtained and clinical signs were scored according to the Diamond Animal Health Carlisle Research Facility scoring key. Daily nasal swabs were taken for virus isolation. Additional serum samples were collected 7 and 14 days after challenge. All serum samples were assayed for the presence of both Type I and Type II BVD-neutralizing antibodies.

Data from clinical scores, viral shedding and serum neutralization studies were statistically evaluated to determine the relative efficacies of the different vaccines. Results showed that the killed Type II, the MLV Type I, and the killed Type II/MLV Type I combination vaccines were effective in protecting calves from Type II BVD challenge, while the killed Type I vaccine was not. Serum neutralization titers suggested that the killed Type II vaccine might confer longer duration of immunity than the MLV Type I vaccine.

Evaluation of IBR Vaccine Virus Shedding After Parenteral Administration to Suckling Calves

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Abstract

Many vaccine strains of IBR are assumed to be abortigenic. There is therefore concern about administering modified live IBR vaccines to suckling calves because of the possibility of shedding of the vaccine virus by vaccinates and subsequent transmission to the pregnant dam. The purpose of Phase I of this study was to show whether IBR MLV vaccine strain RT-22 causes virus shedding after parenteral vaccination of IBR-susceptible calves. Phase II of the study was designed to show whether immunosuppression 90 days after vaccination would result in recrudescence of the vaccine virus and subsequent viral shed.

This vaccine was prepared according to the current outline of production for MLV IBR vaccine except that the vaccine was formulated at 100X the normal release dose titer. Calves (n=12) susceptible to IBR (SN < 1:2) approximately 3-5 months of age were used. For Phase 1, five calves were injected intramuscularly and five were injected subcutaneously with the experimental vaccine. Each vaccinated calf received a single 2 ml dose of the experimental vaccine. Two calves were held as non-vaccinated contact controls. All calves were monitored for nasal virus shed, serum antibody titers, rectal temperatures and clinical responses.

For Phase II, two additional non-vaccinated contact controls were added to make a total of 14 calves. Approximately 90 days after the initial inoculation, all calves were treated daily with dexamethasone (0.1 mg/kg body weight) intravenously for five consecutive days. On the third day of dexamethasone treatment, cattle received LA200 tetracycline (9 mg/lb body weight) to aid in control of potential secondary infections resulting from immunosuppression caused by the dexamethasone treatment. Nasal virus shed was monitored, and blood samples were drawn daily for virus isolation to monitor for viremia.

The Phase I study showed that there was no viral shed by either group of vaccinates or by the contact controls. In addition, the contact controls did not show any evidence of exposure.